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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/709,907	06/04/2004	Douglas D. Coolbaugh	BUR920040156US1	3906
29154 7590 03/26/2007 FREDERICK W. GIBB, III Gibb & Rahman, LLC 2568-A RIVA ROAD SUITE 304 ANNAPOLIS, MD 21401			EXAMINER HA, NGUYEN T	
			ART UNIT	PAPER NUMBER
			2831	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		03/26/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

# Office Action Summary

Application No.

10/709,907

Applicant(s)

COOLBAUGH ET AL.

Examiner

Nguyen T. Ha

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 15-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-13 is/are rejected.
- 7) ☒ Claim(s) 7 & 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 0604.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

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## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of claims 1-14 in the reply filed on 3/15/2007 is acknowledged.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-4, and 8-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Ahn et al. (US 7,154,162).

Regarding claim 1, Ahn et al. disclose a metal-insulator-metal capacitor structure (figure 5) comprising:

- a lower conductor layer (120), wherein the lower conductor layer includes at least one lower capacitor plate and at least one wiring pattern (114);
- at least one capacitor dielectric (130) above the lower capacitor plate;
- at least one upper capacitor plate (140) above the capacitor dielectric; and
- a hardmask (155) above the upper capacitor plate.

Regarding claim 2, Ahn et al. disclose the hardmask is located along the top and sides of the upper capacitor plate (figure 5).

Regarding claim 3, Ahn et al. disclose the hardmask has a pattern matching an etched pattern within the lower conductor layer (figure 5).

Regarding claim 4, Ahn et al. disclose the lower capacitor plate, the capacitor dielectric and the upper capacitor plate comprises a metal-insulator-metal capacitor (figure 5).

Regarding claim 8, Ahn et al. disclose a metal-insulator-metal capacitor structure (figure 5) comprising:

- a lower conductor layer (120), wherein the lower conductor layer includes at least one lower capacitor plate and at least one wiring pattern (114);
- at least one capacitor dielectric (130) above the lower capacitor plate;
- at least one upper capacitor plate (140) above the capacitor dielectric;
- an etch stop layer (150) on the upper capacitor plate; and
- a hardmask (155) on the etch stop layer.

Regarding claim 9, Ahn et al. disclose the etch stop layer is located along the top and sides of the upper capacitor plate (figure 5).

Regarding claim 10, Ahn et al. disclose the hardmask has a pattern matching an etched pattern within the lower conductor layer (figure 5).

Regarding claim 11, Ahn et al. disclose the lower capacitor plate, the upper capacitor plate comprise a metal-insulator-metal capacitor (figure 5).

#### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 5 & 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahn et al. (US 7,154,162).

Regarding claims 5 & 12, Ahn et al. disclose all the claimed limitation discussed above with respect to claims 4 & 8, except for the metal-insulator-metal capacitor comprises a single metal-insulator-metal capacitor, wherein the structure further comprises at least one dual metal-insulator-metal capacitor, and wherein the dual metal-insulator-metal capacitor includes a second capacitor dielectric and a second upper plate. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the at least one dual metal-insulator-metal capacitor, and wherein the dual metal-insulator-metal capacitor includes a second capacitor dielectric and a second upper plate, since it has been held that mere

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duplication of the essential working parts of a device involves only routine skill in the art.

*St. Regis Paper Co. v. Bemis Co. 193 USPQ 8.*

6. Claims 5 & 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahn et al. (US 7,154,162) in view of Tu et al. (US 6,720,232)

Regarding claims 6 & 13, Ahn et al. disclose all the claimed limitation discussed above with respect to claims 1 & 11, except for an insulator layer covering the hardmask, wherein the hardmask is distinct from the insulator layer. Tu et al. teach an insulator layer (64) covering the hardmask (62) figure 11. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the assembly as taught by Tu et al. in to Ahn et al., the modification of Tu et al. would be the benefit for Ahn et al. capacitor's to protect the hardmask layer.

#### ***Allowable Subject Matter***

7. Claims 7 & 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With respect to claims 7 & 14, the prior art alone or in combination does not teach the limitation of the spacing between wires in the wiring pattern is approximately one-third the height of the upper capacitor plate above the bottom of the lower capacitor plate.

### **Citation Relevant of Prior Art**

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Schwarz (US 6,972,265) discloses metal etch process selective to metallic insulating materials.

b. Summerfelt (US 5,851,896) discloses conductive exotic nitride barrier layer for high dielectric constant material electrodes.

### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nguyen T. Ha whose telephone number is 571-272-1974. The examiner can normally be reached on Monday-Friday from 8:30AM to 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dean Reichard can be reached on 571-272-2800 ext. 31. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic

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Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NGUYEN T. HA  
PRIMARY EXAMINER

NH

March 22, 2007